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The underlined text below is being proposed for addition to the Fact Sheet for the Fort Bragg and Mendocino City CSD NPDES permits. Comments and edits (to the underlined text) are welcome.

Monitoring triggers for chronic toxicity protect the receiving water from the aggregate effect of a mixture of pollutants that may be present in effluent. There are two types of WET tests – acute and chronic. An acute toxicity test is conducted over a short time period and measures mortality. A chronic test is conducted over a longer period of time and may measure mortality, reproduction, and/or growth. The Permittee conducted annual chronic toxicity testing using *Macrocystis pyrifera*, *Strongylocentrotus purpuratus*, and *Atherinops affinis*. The following table summarizes the chronic toxicity testing results for 2010 through 2013.

Table F-1. Summary of Chronic Toxicity Results

Date	<i>Macrocystis pyrifera</i>		<i>Strongylocentrotus purpuratus</i>	<i>Atherinops affinis</i>	
	Growth (TUc)	Reproduction (TUc)	Survival (TUc)	Growth (TUc)	
June 14, 2010	8	8	8	8	8
May 31, 2011	40	40	--	--	-
July 23, 2012	8	8	--	--	-
February 28, 2013	8	8	--	--	-

The Ocean Plan contains toxicity testing requirements based on minimum initial dilution (Dm) factors in section III.C.4.c. Following the implementation procedures of the Ocean Plan, Permittees with Dm factors below 99 are required to conduct only chronic toxicity testing. This Order allows for a Dm of 50 for the chronic condition. As shown in Table F-6 of this Fact Sheet, the discharge exhibits reasonable potential to cause or contribute to an exceedance of the Ocean Plan objective for chronic toxicity. Therefore, this Order contains a WET limitation. Additionally, in accordance with the Ocean Plan (section III.C, Implementation Provisions for Table 1), this Order establishes annual chronic toxicity monitoring requirements for the discharge at Discharge Point 001.

The Ocean Plan establishes a daily maximum chronic toxicity objective of 1.0 TUc = 100/NOEC, using a five-concentration hypothesis test, and a daily maximum acute toxicity objective of 0.3 TUa = 100/LC50, using a point estimate model. In 2010, U.S. EPA endorsed the peer-reviewed Test of Significant Toxicity (TST) two-concentration hypothesis testing approach in *National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document* (EPA 833-R-10-003, 2010) as an improved hypothesis-testing tool to evaluate data from U.S. EPA's toxicity test methods. The TST hypothesis testing approach more reliably identifies toxicity—in relation to the chronic (0.25 or more) and acute (0.20 or more) mean responses of regulatory management concern—than the current NOEC hypothesis-testing approach used in the Ocean Plan. TST results are also more

transparent than the point estimate model approach used for acute toxicity in the Ocean Plan that is not designed to address the question of statistical uncertainty around the modeled toxicity test result in relation to the effect level of concern. The TST is the superior approach for addressing statistical uncertainty when used in combination with U.S. EPA's toxicity test methods and is implemented in federal permits issued by U.S. EPA Region 9. Use of the TST approach to establish the numeric monitoring trigger is expected to be protective of the Ocean Plan's numeric toxicity objective.

In 2011, to demonstrate the advantages of the TST approach, the State Water Board conducted a "test drive" comparing results obtained using TST with results obtained using the NOEC statistical approach currently being used in California's WET program ^[1]. Using data from a number of sources, the analysis identified the number of tests passing or failing, the range of effects associated with passing or failing, and the within-test variability associated with these tests using the TST and the NOEC approach. A sample was declared toxic if there is greater than or equal to a 25 percent effect in a chronic test at the permitted IWC. The sample is declared non-toxic if there is less than or equal to 10 percent effect at the IWC.

The results of the test drive indicate that, overall, use of the TST approach declared 2.9 percent of all tests as toxic at the IWC less than 25 percent (i.e., not truly toxic), while the NOEC analysis declared a greater number of those tests toxic, 5.3 percent. The TST analysis also declared 0.1 percent of all tests as toxic with an effect less than or equal to 10 percent (i.e., truly non-toxic) compared to 2.6 percent declared toxic by the NOEC analysis. For chronic toxicity tests using marine species, the ability for the TST approach to more consistently identify truly toxic samples as toxic and truly non-toxic samples as non-toxic is even more pronounced.

Test of Significant Toxicity Design

The TST's null hypothesis for chronic toxicity is:

H_0 : Mean response (In-stream Waste Concentration (IWC) in % effluent) = 0.75 mean response (control)

Results obtained from a single-concentration chronic toxicity test are analyzed using the TST approach and an acceptable level of chronic toxicity is demonstrated by rejecting the null hypothesis and reporting "Pass" or "P".

The chronic IWC (in % effluent) for Discharge Point 001 is 2%. The chronic WET limit for Discharge Point 001 is expressed as a null hypothesis (H_0) and regulatory management decision (b value) of 0.75 for the chronic toxicity methods in the MRP. The null hypothesis for this discharge is:

H_0 : Mean response (2% effluent) = 0.75 mean response (control)

Results obtained from a single-concentration chronic toxicity test shall be analyzed using the TST hypothesis testing approach in the MRP. Compliance with this chronic toxicity limitation is demonstrated by rejecting the null hypothesis and reporting "Pass" or "P".

If chronic toxicity results for effluent samples exceed the limit, the Permittee must

initiate accelerated monitoring as specified in the MRP (Attachment E, section V). After accelerated monitoring, if conditions of chronic toxicity are found to persist, the Permittee will be required to conduct a Toxicity Reduction Evaluation, as described by the MRP.

Notification requirements for chronic WET testing include a 72 hour verbal notification requirement and a 14 day written report requirement, if test results indicate toxicity. The 14 day written notification is established in the USEPA WET Guidance documents cited in the MRP. The 72 hour verbal notification requirement is being added to provide the Regional Water Board with knowledge of the toxicity in advance of the written report. The 72 hour requirement is intended to give the Permittee sufficient time to make a telephone call to Regional Water Board staff and accounts for non-working days (e.g., weekends). Verbal notification of WET test exceedances may be left by voice mail if the Regional Water Board staff person is not immediately available by telephone.

This Order retains the requirement for the Permittee to conduct a screening test using at least one vertebrate, invertebrate, and plant species. After the screening test is completed, monitoring can be reduced to the most sensitive species.

[1] State Water Resources Control Board. 2011. Whole Effluent Toxicity Test Drive Analysis of the Test of Significant Toxicity (TST).
http://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/docs/tst_test_drive.pdf

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http://www.waterboards.ca.gov/water_issues/programs/state_implementation_policy/docs/tst_test_drive.pdf